040786

LONG ISLAND SINCLAIR TIMEX GROUP

L.I.S.T.ING

April 1986

Issue Price $ 50

MEETING NOTES - MARCH 16, 1986

The March meeting of LIST was called to order at 2:00PM on Sunday, the 16th, at the Huntington Public Library. There were 27 attendees. The Treasury was reported to contain $928.84, of which $150 was owed to Paul Donnelly for the publication of the March Newsletter. Membership was reported at 98 paid members prior to the meeting (this increased to 100 by the end of the day).

Chuck Russell commended Myles Cohen's work on the data base, and called for more volunteers to enter the information on other newsletters. Members who feel they would like to review exchange newsletters, first hand, and feel they could spare a few minutes per week are encouraged to call Jeff Street. The job entails entering such information as Title, Author, Issue and Page numbers, and subject matters for the articles in particular newsletters, into our copy of PRO/FILE.

A phone chain, for inclement weather, was discussed. Notice will be placed on the Zebra Bulletin Board, if a meeting is cancelled. In addition, members may call the meeting site. If the Library is closed, the meeting is cancelled. Finally, if still in doubt, call Chuck Russell.

Returns of Library tape 4.X have finally begun to arrive and tape 5.1 is now ready. It will be beta tested after the next meeting and then duplicated and dispatched. Please remember to let us know if you belong in a special interest group (e.g., TS 1000 only) or have never received a tape. Our records have some gaps and you might be in one. Response from other user groups has, so far, been thin. Please note that while much of the LIST Library tape is not copyrighted and some is public domain, we consider the actual tapes to be the private property of paid LIST members. Members were reminded that they pay their $15 dues in order to obtain their copy and that they have either created and/or entered the programs by pounding their keyboards. Providing the tapes to outsiders is a disservice to other members and an abuse of membership rights.

The Midwest Computerfest (May 3 & 4) and Trenton Computer festival were discussed. A vote to pay for the admittance of a member who would distribute LIST literature was taken and passed. The TCC is April 19th & 20th and the member will be selected next meeting. So far only Martin H has volunteered. We will be asking Zebra for help, as well.

Again on Library tapes a plea was made for identifying the computer to be used. Please note if your program is 2068 or Spectrum somewhere in the program itself. Some members have begun doing this and it is a big help. If your program is Spectrum only and won't even load successfully or a 2068, add a BASIC Loader which says so before the actual program.

Complaints were made about light printing in the March issue. We will make every effort to correct this situation. If a member must have specific information they may send in an SASE and we will try to make copies of specified pages. Please do not make such requests unless you must have the information.

Cedric B. demoed his internally mounted TI99 keyboard for the TS 2068. He notes there are several versions of this board on the Surplus market (Bob G. says he knows of 4) and only the ALPS board from Japan can be easily fitted into the TS 2068 case. See Cedric's article for details of this outstanding project. Cedric's craftmanship was truly impressive.

A LIST BBS was again discussed. Chuck has checked with the phone company. Line charge is $113 and it would cost $8.13/month for the phone line. Zebra has expressed an interest in helping us fund and run such a system, but much more discussion is required.

Bob G. noted that he has found where most of the 3" disks are going - Mainland China.

NEXT MEETING

April 13th @ 2:00PM - Huntington Library - Theme-Making Archival copies.

May 18th @ 2:00PM - Probably at Huntington Library - Tentative Theme - SWAP meet (exchange (used only) hardware & Software)

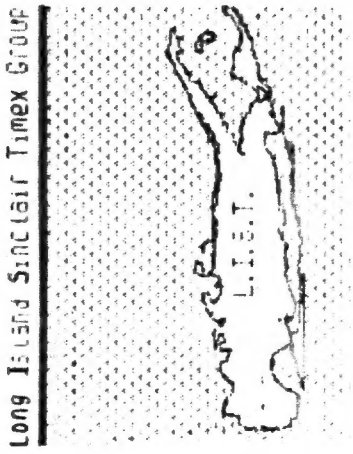
PRESENTATION

Stewart N. of Zebra gave us a crash course in Modems and Telecommuication. He covered everything from the history of telecommunication, through Bit streams, the RS 232 C standard, Asynch vs Synchronous communication, Modems, baud rates and Frequency Shift Keying.

Stewart then reviewed the 2050 Modem schematic and commented on what each component did. This hour and 15 minutes session was packed with information on the modem and even the RS 232 port add-on (which is to be published in Time Designs

LIST GROUP
P.O. BOX 458
CENTERPORT, N.Y. 11721-0458

IN THIS ISSUE



SPECIAL NOTE

Harvey Rait, one of the original LIST group members, and a frequent contributor to group activities, will be going into the hospital shortly for an operation.

We all wish Harvey a speedy recovery and hope to see him soon.

VENDOR REPORT

Zebra Systems
78-06 Jamaica Avenue
Woodhaven, N.Y. 11421
718-296-2385

Discount on 2068/TS 1000 Hardware. Modems $10(no garantee). Call for Catalog

P.V. Tubes
104 Abbey Street
Accrington, Lance-
BB 5 1 EE, United Kingdom
(0254)-36521/32611

Parts - Spectrum ULA -£ 7.20
ZX81-ULA -£ 4
Parts for IF I and ZX Printer
Repair Manuals e.g., for IF I -£

Also: Sunset Electronics

New Discounts - call

SUBSCRIPTION NOTICE

Please check your mailing label. Above your last name you will see the month and year in which you will receive your last issue of LISTing (LLIST) Newsletter. If this number does not agree with your records please let us know. This is a good time too, to request information on specific subjects for next years newsletters or just let us know

****
KEYBOARD MANIA - Part 3
****
By Cedric R. Bastiaans ©

IX. FITTING THE TI-99/4A KEYBOARD INTO THE TS 2068 CASE

The TI keyboard which flooded the market after the demise of the TI computer, offers a fine opportunity for you to try your hand at putting a full-travel keyboard to work for one of the finest computers around.

> But first a word of warning: Neither LIST nor I can be held responsible for any damage resulting from these proceedings. Once you open up your computer, you are on your own, voiding all warrantees, if any.

Also, if changing a light bulb means a major endeavour for you, maybe you should not attempt any of the following...

IX.1 WHICH KEYBOARD?

I know of at least two versions. THE FOLLOWING PROCEDURES ARE ONLY FOR ONE OF THEM! It may be that the other version lends itself to a like modification. But for now, I can only address myself to one item at a time.

The versions in question are (and I am putting the corresponding deviations for the WRONG version in parentheses):

Black keys with white legends (beige keys with grey).
Keys are a trifle hard to remove (easily removable).
Key switches are only numbered 1 through 48 (alpha-numerically indicated)
15-pin ribbon cable connector is numbered 1 thru 15, R to L (not numbered).
The PCB identifications are 1039019-1 (1039019-3), made in Japan (Korea), there is no TI-logo (there is), 94 V-0 (same), made by ALPS (by SE-JIN).

In addition, the PCB TRACES ARE TOTALLY DIFFERENT!
Also, it appears that the Alpha Lock key is not always a Push/Push type. You're in luck if it isn't (see later).

A dead give away is the fact that my keyboard has a RECESSED PCB, in contrast to the other one which has one which is very close to the mounting flanges

The TI keyboard can still be purchased from the Arnold Co. (new for $5.99 + $3 shipping), 214 Hill Lane, Red Oak TX 75154 or from the LOLIR LECTRONICS CORP. (surplus for $3.75 + $3.50 shipping), 13933 N. Central Expressway, suite 212, Dallas TX 75243. If you want to order, I suggest you specifically ask for the ALPS keyboard.

Once again, it may be possible to modify the TS 2068 to accept the other KB. If there is enough interest, I just might endeavour to look into it. Write me c/o LIST. (See Note at the end of this article).

IX.2 THE TI MATRIX

The TI matrix is shown in Figure 9. Note that I have labeled the KBD and the A-lines as 1T, 2T etc. This to avoid confusion with the TS 2068 matrix.
At first glance there appears to be a similarity between it and the TS 2068. Aside from the obvious deviations in the 8 keys , . / ; = CNTL FCTN and Alpha Lock, there is a major problem in that the entire bottom row is shifted over one key!

But fear not, we can lick it. Let's first discuss what to do with the dedicated key functions. It should be obvious that there is no room for such elaborate IC functions as described in Chapter VII of Part 2 of this series. But there remain

some useful ones, such as the comma, the period, the colon, the semi-colon and the Delete key. In addition, I suggest that you use TWO Symbol Shift keys, one on each side of the Keyboard. Then there is the Alpha Lock; we could wire it simply in parallel with the Caps Shift keys. But this has limited usefulness; it is NOT the same as Caps Shift 2, a TRUE caps shift. In contrast, the Alpha Lock does not

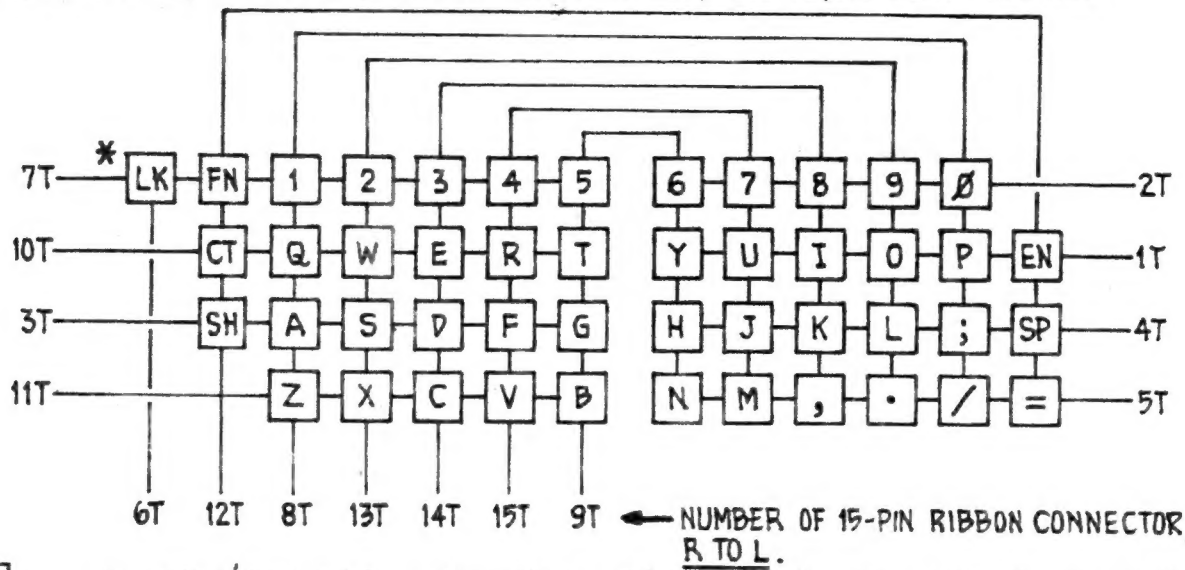


FIGURE 9 * = PUSH/PUSH TYPE LK = αLOCK FN = FUNCTION CT = CONTROL SH = SHIFT

allow the punctuation marks to work, nor the numbers, nor the Symbol Shift. It is only useful with the cursor keys and of course the letters.
That's why I elected to use the Alpha Lock key as an asterisk key, to use with the Zebra Disk Drive. One just has to get used to operating it in a quick Push/Push fashion, so as not to cause it to go into a continuous repetition of the character! I have tried in vain, to modify this key. I leave it up to the reader to do with it as he or she sees fit. No further reference will be made to this key, not even as an asterisk key!

IX.3 THE MODIFIED TI MATRIX

Figure 10 shows the TI keyboard as we would want it to be. Quite obviously, the dedicated keys are:

Key Switch 11, for the DELETE key
Key Switch 22, for the COLON key
Key Switch 46 and 48, for the SYMBOL SHIFT keys
Key Switch 32, 42 and 43 for the SEMICOLON, COMMA and PERIOD keys

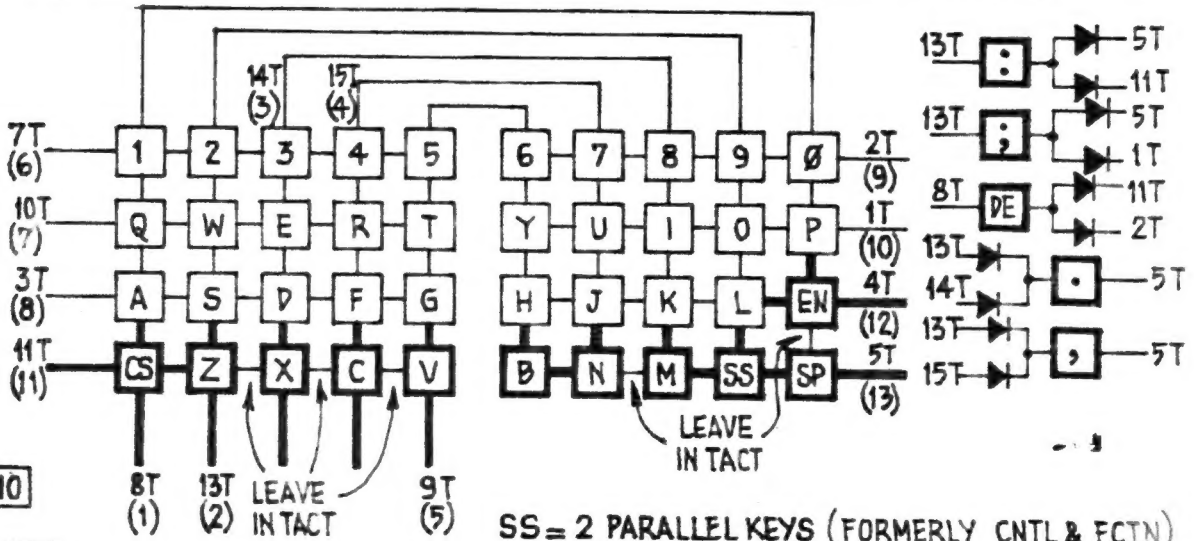


FIGURE 10

NOTE:
M = NEW KEY, WITH EXISTING LINE AND A NEW LINE

SS = 2 PARALLEL KEYS (FORMERLY CNTL & FCTN)
: = FORMERLY /-KEY
DE = FORMERLY =-KEY

This seems like a good time to list all the keys, as we have now defined it:

Switch #	Key	Switch #	Key	Switch #	Key	Switch #	Key
1	1	13	W	25	D	37	C
2	2	14	E	26	F	38	V
3	3	15	R	27	G	39	B
4	4	16	T	28	H	40	N
5	5	17	Y	29	J	41	M
6	6	18	U	30	K	42	,
7	7	19	I	31	L	43	.
8	8	20	O	32	;	44	CS
9	9	21	P	33	EN	45	OPTION
10	0	22	:	34	CS	46	SS
11	DE	23	A	35	Z	47	SP
12	Q	24	S	36	X	48	SS

IX.4 CUTTING THE TRACES

We are now ready to cut into the PCB. If you own a Dremel Moto-Tool kit or the like, you'll be done in no time. But otherwise, an X-acto knife with a No.11 blade will do just fine, even if it takes a little longer.

The following list will take you step by step; put the PCB with the 15-pin connector on top, traces of course towards you.
If you're ordered to cut a trace, draw the X-acto knife towards you, taking care not to inadvertantly cut adjacent traces. You may find that an additional cut or two may help. Now, move the X-acto blade over about 1/16th of an inch and repeat. Next, gently pry the thusly cut trace away, see Figure 11.
Don't be afraid, there is really nothing to it. And if you find that you cut the wrong trace, don't despair. It is always possible to put a jumper back to where you erroneously cut the trace. But why not try to avoid errors all together?

On Switch 45 (LK), cut BOTH traces close to the solderpads.
On Switch 11 (=), cut BOTTOM trace close to pad, UPPER trace on both sides.
On Switch 32 (;), cut trace close to TOP pad.
On Switch 22 (/), cut TOP trace next to pad, BOTTOM trace ONLY to the right of it!
On Switch 42 (,), cut traces on both sides of BOTTOM pad.
On Switch 43 (.), cut trace to BOTTOM pad. Careful! Don't cut the major trace; just the small portion connecting to the pad!
On Switch 35 (Z), cut BOTTOM trace between it and BOTTOM of 23.
On Switch 36 (X), cut trace close to BOTTOM pad.
On Switch 37 (C), do the same for the BOTTOM pad.
On Switch 38 (V), do the same with the BOTTOM pad.
On Switch 39 (B), cut the trace close to the TOP pad.
On Switch 40 (N), cut trace to BOTTOM pad.
On Switch 41 (M), cut traces on both sides of BOTTOM pad.
On Switch 47 (SP), cut the trace to the LEFT pad.
On Switch 48 (FCTN), cut the traces to BOTH pads.
On Switch 46 (CNTL), cut the traces to BOTH pads.
On Switch 33 (EN), cut the trace to the TOP pad.
On Switch 34 (CS), cut the trace to the TOP pad.

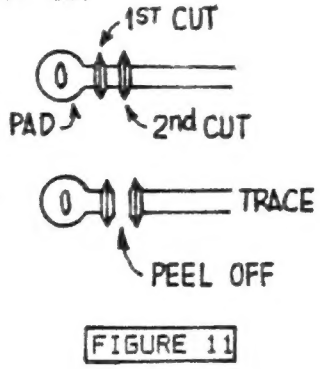


FIGURE 11

This was it, as far as cutting traces is concerned. The next installment will instruct you to make several jumpers and we will also cut into the TS 2068 case!

---oooOOOooo---

Note:
The Author is pleased to announce that he has found a way to put the Korean-made SE-JIN keyboard into the TS 2068 case! The Japanese-made ALPS keyboard is STILL to be preferred, though. See the upcoming installments in this Keyboard Mania series...

IMPROVING THE ZEBRA GRAPHICS TABLET

Users of the Zebra Graphics Tablet will have no doubt noticed the annoying behavior that I will term "Spray". If you don't press the stylus against the tablet very firmly, you get a wild spray of dots.

You may have also noticed that the "Spray" tends to be directed towards the center of the tablet. This is because there are a pair of centering resistors which cause tablet readings to return to center when there is no contact with the tablet. The "Spray" phenomena is essentially micro seperations of stylus contact. The duration of these micro seperations is very short but the cursor instantly centers on each seperation event, causing the "Spray".

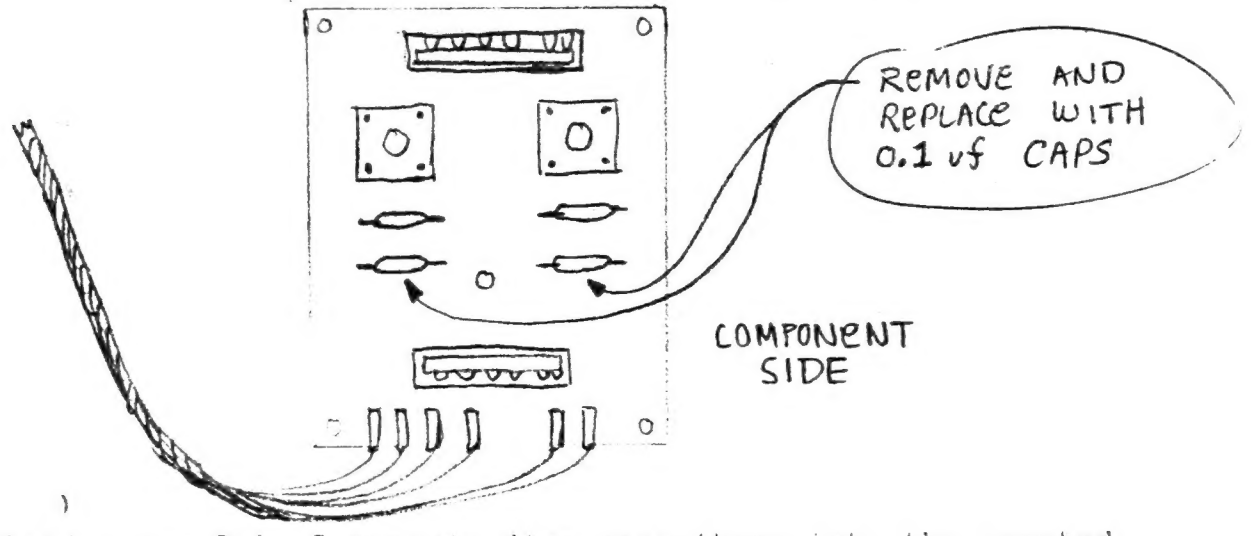
By eliminating the instant centering of the tablet you will be elimating the "Spray" phenomena. You can do this by removing two resistors and replacing them with 0.1 uf capacitors. To do this follow the instructions below ...

1) Place the tablet upside down and remove seven screws.

2) Carefully seperate bottom of tablet from top. Unplug two connections from the pc board inside.

3) Unscrew pc board from bottom of the tablet.

4) Desolder the two resistors indicated in the diagram below.



5) Solder two 0.1 uf ceramic disc capacitors into the vacated resistor locations.

... put the tablet back together (this may be a bit tricky) and try it out. You will notice a significant improvement in performance.

USING THE LIBRARY TAPE

As there seems to be some confusion on the use of the library tape, we are re-publishing some of the previous descriptions of their origins and use, in this issue. In addition, a detailed explanation of how to use the tape follows:

1. Each member will recieve, from time to time, a package containing the following:

   a) One current library tape, either 60 or 90 minutes long and recorded with a number of programs on each side.

   b) One "member" tape. This tape starts out blank, but is soon used by members to add their contribution to the library.

   c) A sheet of mailing labels. Usually these will be from 1 to 6 labels. The last label is for returning the package to LIST after all the other labels have been used.

   d) A transmittal sheet which you complete to tell us when you received the tape, when you mailed it on, and what you added to the "member" tape.

   e) Possibly, a list of the programs on the tape.

2. When you receive the package do this:

   First, carefully open the envelope. You will be re-using it to mail the tapes to the next member of your group, so please be careful. If you destroy the package it is your responsibility to replace it. Second, remove the contents and make sure they are all there (see list above). If not, please put a note about what is missing into the envelope. Sign and date the note, please. Do not misplace the contents. Now, take the library tape and make a copy. You can either LOAD each program into your computer and then SAVE it to tape, or make an audio copy of the tape. We recommend the second method, as it is much less time consuming. Don't forget to copy both sides. You can use a dubbing deck or two tape recorders and a Radio Shack alternator cord. Do not try to make a copy just by going from deck to deck. It will be an inferior and unreliable copy.

   Note that some programs are TS 2068 and some are Spectrum. You will have to figure out which is which. As with cataloging the tape, there is simply not enough time for us to provide all these services on a volunteer basis. By the way, you will often find that TS 2068 and Spectrum programs can be LOADED into (or Merged) and SAVEd from the opposite machine with no problems. Just don't try to RUN the program, in between.

   The fourth step is to add your own program to the member tape. Look at the transmittal sheet. Use the information on that sheet to determine where the last member finished adding programs. Cue up the tape to a blank section after the last members program and then add your contributions. You must

supply one program or you will be dropped from the "full participation" groups. Your "program" can be a music or graphic display, utility subroutine, UDG's, etc. as well as a full blown home, business or game program. (New LIST Logo's are always welcome).

Now, with your program(s) safely added to the member tape, fill in the transmittal sheet. Place the library and member tapes back in their boxes and place the transmittal sheet, the two tapes and any other documents you received, back in the shipping pouch. Do not CLOSE THE POUCH YET.

This is very important! Look at the sheet of stick-on mailing labels. Take the top label on the sheet and place it over the label addressed to you, which is currently on the pouch. Do not use the LIST label unless you are the last recipient. Seal the package and take it down to the post office.

Pay for first class postage to the next member (or LIST, only if you are the last one in your group) and mail the envelope.

Remember

1) Do not keep the tape for more than 1 calendar week.
2) Do not erase other members programs.
3) Do provide your comments about the programs.
4) The library tape is not Public Domain, do not share it with others from outside LIST group.
5) Send one working programs. You may send non-working programs, too, but you must document the problem. Do this either within the program or on a separate letter.
6) Don't send commercial software unless it is your only backup copy (for review) by a LIST staffer or it is a "problem" program. Two such recent examples were Avalon and Rasputin, game programs for the Spectrum. Both use interrupts and caused LOADing problems for the user. Avalon cannot be copied by using IF III and Rasputin will not run, even on a 2068 equipped W/7 pullup resistor. The user was advised to either modify his hardware or return the tapes for credit. Make sure you document the problem- e.g., won't LOAD, LOAD's but quits, etc.
7) Follow the principles of LIST programming:
   a) Main routines at beginning of program
   b) DATA and information statements at the end.
   c) Line 9998 should automatically SAVE the program and any bytes files.
   d) Define variables in the program, preferably in a subroutine near the end, and CLEAR them before SAVING.
   e) Use REM statements to explain the program. Remember this will be the only documentation users will receive.
   f) Avoid the use of the TS 2068 "only" commands (RESET, FREE, etc.) where possible. Consider using IN for reading the 2068's joystick ports. If you want to use joyports and/or keyboard, consider setting a variable, (by the user), which causes any one I/O method to work. E.G., use a menu to allow selection of either joystick or keyboard. Then use an IF statement before scanning to choose the correct program lines.

Eliminating the 2068 specific commands will allow most programs to run on either machine.

Note in line Ø or 9999 whether the program is TS2068 or Spectrum. Also consider names like:

GAME.TS (a game for TS 2068)
GAME.ZX (a game for Spectrum)

NOTE: YOU MUST READ AND FOLLOW THE ABOVE INSTRUCTION PRECISELY. FAILURE TO DO SO WILL RESULT IN YOUR REMOVAL FROM FIRST ROUND PARTICIPATION IN THE TAPE LIBRARY.

COMPUTER DICTIONERY

Specificly - Contraction of specifically

Bear (essentials) - Same as bare in mind (e.g., a picnic basket for Yogi)

Origional - Beginning in a specific region of memory.

Wordproccessed - Text which is prodduced using a Speling Chequer.

Newletter - Additional letters to be used in English language. The 27th letter may be the myackisnak(6).

Rightfull - completely full

Bare in mind - anaked microprocesser.

Experation DAte - The date after which you become exasperated, waiting for a mail order.

Charector, (see charectar) a dot-matrix pattern vector.

Survaillance (govenment)-using your computer while on vacation in the Rockies.

Rediculous - the color of your face when you ask a dumb question about computers.

Nucular - of or pertaining to n's (greek letter nu).

Disasembly - what happens when your disassembly of someone else's program starts to look like a disaster.

Revue - rehash of Psion software.

Definetely (interested) - the science or art of defining new meanings for misspelled words.

Ban (as in: let's ban together) a practice of the Boston Computer Society.

TOTALLY SAFE MACHINE CODE FOR THE ZX81 AND TS1000

Rather than starting by beating a dead horse, the answer will precede the explanation.

Here are two templates:

```
   1 REM .........1.........2...
.....3.........4.........5.....
....6.........7.........8.......
..9.........A.......    /■
   2 REM .........1.........2...
.....3.........4.........5.....
....6.........7.........8.......
..9.........A.........B.......
 /■
```

Template #1 provides 112 bytes of machine code space. When more than 118 bytes are needed, template #2 is added. Template #2 provides 122 bytes of machine code space. When still more space is needed, template #2 is copied to line #3 etc., as many times as you like.

Program memory begins at 10509. The following chart shows the memory addresses where the templates are stored. The addresses ***** are especially important. Your machine code can be POKEd into the text area of any template, with one (but important) restriction.

NOWHERE in your machine code can CHR$(118)="ENTER" appear! The computer will interpret it as the end of the REM statement, with disastrous results.

ORMAT	1 REM	2 REM	3 REM	4 REM	5 REM	...
SB LINE #	16509	16627	16755	16883	17011	...
SB LINE #	16510	16628	16756	16884	17012	...
SB LENGTH-4	16511	16629	16757	16885	17013	...
SB LENGTH-4	16512	16630	*****	16886	*****	...
HR$(234)="REM"	16513	16631	16759	16887	17015	...
TART OF TEXT	16514	16632	16760	16888	17016	...
ND OF TEXT	...	...	...	...	...	...
HR$(118)="ENTER"	16626	16754	16882	17010	17138	...
TEXT BYTES	112	122	122	122	122	

Avoiding CHR$(118) in your machine code is always possible, but here are sneaky ways it can get there without you being aware of it. Either byte of a two byte CALL or JP address might accidentally be CHR$(118). The first sneaky addresses in RAM are: 16502, 16758, 17014, 17270, etc. by increments of 256 bytes.

Ah hah! The templates hide these under *****, so you do not have to worry about them. Don't stop worrying yet, though.

There are two more cases which require caution.

The first is another sneaky one, but simple to avoid. Never use JR __,+120 . Use JR __,+121 and add a NOP instead.

The other case is obvious, but harder to fix. LD __,118 and CP 118 cannot be used.

For LD __,118 , use LD __,117 : INC __ .
For CP 118 , use CPL : CP 37 : CPL

In brief, never use:

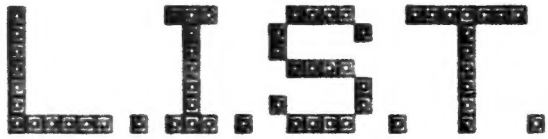
```
JR __,+120 ,
LD __,118 , or
CP 118 .
```

The result is perfectly safe machine code which can be edited, added to, and saved to tape. (All right, you experts; you can't use I/O device (N)=118 , and you better use (HL) when addressing ROM routines.)

HEY! It works! Forget that dead horse.

The wierd doodad at the end of the templates is simply three NOPs followed by JR +6 . It comes in handy when your code runs into the next template.

One last hint--keep a spare copy of both templates.



LIST PRINTER INFORMATION

PARALLEL - SERIAL INTERFACES:

SERIAL INTERFACES send information to the printer one bit (0 or 1) at a time, one right after the other.

PARALLEL INTERFACES send information to the printer eight bits (one byte) at a time.

You can't connect a parallel interface to a serial printer, or vice versa. No damage will result - it just will not work!

SERIAL is also referred to as RS232.

PARALLEL is also referred to CENTRONICS.

DOT MATRIX - DAISY WHEEL:

DAISY WHEEL PRINTERS provide LETTER QUALITY printing, equal to, if not better than an electric typewriter.

The term "DAISY WHEEL" relates to the print wheel which has "petal-like" elements which stem from its hub. The individual characters are embossed on the petal ends and when activated, will print those characters on paper.

DOT MATRIX PRINTERS:

The DOT MATRIX process is an ingenious method of forming the character a column at a time on the print head and transferring it to paper. The print head has a set of electronically activated thin rods (needles) arranged in a vertical column. On the PROWRITER 8510 printer, characters are built on either a 8 x 8 or 7 x 9 matrix, much the same way that characters are built up on a CRT tube.

As the printer carriage moves horizontally, the needles needed for that matrix column are fired. With a five-column matrix the needles must fire five times to create a character.

PRINTING SPEEDS:

DAISY WHEEL printers usually print between 10 and 30 CPS.

DOT MATRIX printers usually print between 80 and 180 CPS.

CPS = CHARACTERS PER SECOND.

Printing speeds vary from one printer to another. DAISY WHEEL printers are relatively slow as compared to the DOT MATRIX printers. However the letter quality print more than justifies the slower printing speed.

ASCII CHARACTER AND CONTROL CODES:

One thing that all 80 column printers seem to have in common is that they use the standard ASCII codes for control code commands to instruct the printer to do something; like change fonts, change from the normal print mode to a graphics mode.

Codes 0 to 32 are unprintable characters and are used as printer commands such as line feed and carriage return.

Codes 33 to 127 (and beyond) are the standard character codes as we are used to and are also used by printers as control codes to underline characters, back space to slash a zero or to change from pica pitch to elite pitch or to double strike characters to print bold.

If you intend to program your printer without using a word processor such as TASWORD II or MSCRIPT, then there will be several ASCII codes you will become familiar with:

ESC - ESCAPE CHR$ 27 - This command is the kingpin of all printer codes. Escape advises the printer that a control code is about to follow.

CR - CARRIAGE RETURN CHR$ 13 - This code commands the printer to return to the left most position after printing a line of text.

LF - LINE FEED CHR$ 10 - This code commands the printer to rotate the platen which will move the paper up one line.

Your printer user manual has charts indicating which codes are used as control commands and their respective functions.

Learning to use these commands takes time and patience and I personally feel that it is easier to program your printer from a word processor such as TASWORD II and MSCRIPT which provide the means with which to activate the hidden functions in your printer. This method is called embedding control codes by using graphic characters or using a graphics format line.

PRINTER SWITCHES:

Most printers have one or more banks of DIP switches for the printer operator to set printer functions instead of using ASCII control characters to program the printer to do the same thing.

Some switches select character sets, provide a slashed zero, change character pitch or perform a line feed and change bidirectional printing to unidirectional printing.

Switches are placed in an accessable location for the operator to activate.

PRINTER PAPER:

Most printers can handle either or a combination of the following paper types:

FAN FOLD - Sprocket feed, clean perf paper or forms.

SINGLE SHEET - Common 9 x 11, 9 x 14, or letter head.

ROLL PAPER - Pulp variety as used for TELEX machines.

I use roll paper for all my rough drafts then switch to either fan fold or single sheet paper for a final copy.

CARRAIGE SIZE: 10 inch to 15 inch

This depends on YOUR requirements. If you intend to print out spread sheets, then the 15 inch carriage should be considered before you purchase a printer, otherwise a 10 inch carriage should be adequate.

TIMEX COMMANDS:

LPRINT and LLIST - All printers respond to these commands.

COPY - Most EPSON and EPSON COMPATABLE printers and OLIVETTI printers will respond to a COPY command from the keyboard.

NOISE:

Large printers are noisy! Some make more noise than others. This should not turn you off towards using a printer. Placing your printer on a foam pad will absorb lots of noise and if it really bothers you, enclose the printer within an acoustical enclosure.

COMMERCIAL PRINTER INTERFACES AND PRINTER DRIVER SOFTWARE.

PARALLEL INTERFACE	PRINTER DRIVER SOFTWARE LOCATION
AERCO	HIGH MEMORY
OLIGER	PRINTER BUFFER
TASMIN B	HIGH MEMORY
ZPRINT-80	HIGH AND LOW MEMORY
for SPECTRUM I use:	
AERCO	HIGH MEMORY
KEMPSTON E	EPROM
SERIAL INTERFACE	
BYTE-BACK	have no information at hand

PIN DOT GRAPHICS - PROWRITER

```
  5 POKE 64256,0
  6 LPRINT "PIN DOT GRAPHICS - PROWRITER"
  7 LPRINT CHR$ (13);CHR$ (10);
  8 LPRINT CHR$ (13);CHR$ (10);
 10 FOR x=1 TO 60
 20 LPRINT CHR$ (27);CHR$ 83;"0010";
 30 FOR i=1 TO 10
 40 READ B: LPRINT CHR$ (B);
 50 NEXT i
 60 RESTORE
 70 NEXT x
 80 LPRINT
 90 DATA 64,64,64,127,115,115,127,64,64,0
100 POKE 64256,1
105 LPRINT CHR$ (13);CHR$ (10);
106 LPRINT CHR$ (13);CHR$ (10);
110 LLIST
```

PIN DOT GRAPHICS 2 - PROWRITER

```
90 DATA 96,96,96,96,127,127,3,3,127,127
```

```
SILVER REED PRINTER DEMO

  5 POKE 64256,0
  6 LPRINT "SILVER-REED PRINTER
DEMO"
  7 LPRINT CHR$ 13;CHR$ 10;
  8 LPRINT CHR$ 13;CHR$ 10;
  9 LPRINT
 10 LPRINT "SAMPLE OF ";
 20 LPRINT CHR$ (27);"E";
 30 LPRINT "AUTO UNDERSCORE";
 40 LPRINT CHR$ (27);"R";
 50 LPRINT " BY ESC E/R";
 55 LPRINT CHR$ 13;CHR$ 10;
 56 LPRINT CHR$ 13;CHR$ 10;
 60 POKE 64256,1
100 REM BOLD PRINT - sllr2.bas
105 POKE 64256,0
110 LPRINT "SAMPLE OF ";
120 LPRINT CHR$ (27);"O";
130 LPRINT "BOLD PRINT";
140 LPRINT CHR$ (27);"&";
150 LPRINT " BY ESC O/&";
160 LPRINT CHR$ (13);CHR$ (10);

170 LPRINT CHR$ (13);CHR$ (10);

200 REM SUPER SCRIPT - sllr3.ba
s",
205 POKE 64256,0
210 LPRINT "SAMPLE OF ";
220 LPRINT CHR$ (27);"D";
230 LPRINT "SUPER SCRIPT ";
240 LPRINT CHR$ (27);"U";
250 LPRINT " BY ESC D/U";
255 LPRINT CHR$ 13;CHR$ 10;
256 LPRINT CHR$ 13;CHR$ 10;
260 POKE 64256,1
300 REM SUB SCRIPT - sllr4.bas
305 POKE 64256,0
310 LPRINT "SAMPLE OF ";
320 LPRINT CHR$ (27);"U";
330 LPRINT "SUB SCRIPT ";
340 LPRINT CHR$ (27);"D";
350 LPRINT " BY ESC U/D";
360 LPRINT CHR$ 13;CHR$ 10;
365 LPRINT CHR$ 13;CHR$ 10;
370 POKE 64256,1
401 REM Set left-hand margin to
10 & reset to zero- sllr5a.bas

402 REM Set FOR-NEXT LOOP 1 les
s than required margin width.
404 LPRINT
405 POKE 64256,0
410 LPRINT "LEFT MARGIN:10": LP
RINT
420 LPRINT CHR$ (13);CHR$ (10);
430>LPRINT "1";".....10";"..
.....20";
440 LPRINT CHR$ (13);CHR$ 10;
442 FOR I=1 TO 9
444 LPRINT CHR$ (32);
446 NEXT I
448 LPRINT CHR$ (27);CHR$ (57);

465 LPRINT CHR$ (13);CHR$ (10);

470 LPRINT "BBBBBBBBBBBBB"
475 LPRINT CHR$ (13);CHR$ (10);

476 LPRINT "aaaaaaaaaaaaa"
477 LPRINT CHR$ (27);CHR$ (13);
"P";
480 POKE 64256,1
490 LPRINT CHR$ (13);CHR$ (10);

491 LPRINT CHR$ (13);CHR$ (10);

501 REM Back space the / on the
0 to form a slashed zero. sllr
5
505 POKE 64256,0
510 LPRINT "SAMPLE OF 0";
520 LPRINT CHR$ 8;"/";
530 LPRINT " BACK SPACE."
590 LPRINT CHR$ (13);CHR$ (10);

591 LPRINT CHR$ (13);CHR$ (10);

595 POKE 64256,1
```

```
 hor.spacial spac
ing - sllr7.bas
 605 POKE 64256,0
 610 FOR N=1 TO 10
 620 LPRINT CHR$ (27);CHR$ (3 );
CHR$ (N)
 630 LPRINT "PRINT SAMPLE OF n=
";N
 635 LPRINT CHR$ 13;CHR$ 10;
 640 NEXT N
 650 LPRINT CHR$ (27);CHR$ (31);
CHR$ (12)
 660 LPRINT CHR$ (13);CHR$ (10);

 661 LPRINT CHR$ (13);CHR$ (10);

 670 POKE 64256,1
 701 REM Tab setting and tab cle
ar - sllr8.bas",
 705 POKE 64256,0
 706 LPRINT "TAB SETTING AND CLE
AR"
 707 LPRINT CHR$ 13;CHR$ 10;
 708 LPRINT

 710 FOR N=1TO 4
 720 LPRINT "0123456789";
 730 NEXT N
 735 LPRINT CHR$ 13;CHR$ 10;
 736 LPRINT CHR$ 13;CHR$ 10;
 740 LPRINT
 750 FOR N=1 TO 3
 755 FOR I=1 TO 10: LPRINT CHR$
(32);: NEXT I: LPRINT CHR$ (27)
;"I";
 760 NEXT N
 780 LPRINT

 790 LPRINT CHR$ (9);"X";CHR$ (9
);"X";CHR$ (9);"X"
 791 LPRINT CHR$ (9);CHR$ (9);CH
R$ (27);"@"
 792 LPRINT CHR$ (9);"X";CHR$ (9
);"X"
 795 POKE 64256,1
 796 LPRINT CHR$ (13);CHR$ (10);

 798 LPRINT CHR$ 13;CHR$ 10;
 801 REM Setting line feed amoun
t - sllr9.bas
 805 POKE 64256,0
 806 LPRINT "SETTING LINE FEED A
MOUNT"
 807 LPRINT CHR$ 13;CHR$ 10;
 808 LPRINT
 810 FOR N=2 TO 8
 820 LPRINT CHR$ (27);CHR$ (30);
CHR$ (N);
 830 FOR K=1 TO 3
 840 LPRINT "- PRINT SAMPLE OF n
= ";N
 845 LPRINT CHR$ 13;CHR$ 10;
 850 NEXT K
 860 LPRINT CHR$ (27);CHR$ (30);
CHR$ (9);
 870 LPRINT CHR$ (10);
 880 NEXT N
 884 LPRINT CHR$ 13;CHR$ 10;
 886 LPRINT CHR$ 13;CHR$ 10;
 890 POKE 64256,1
 900 POKE 64256,1
 901 REM Absolute Tab -sllr10.
 905 POKE 64256,0
 906 LPRINT "ABSOLUTE TAB SET"
 907 LPRINT CHR$ 13;CHR$ 10;
 908 LPRINT
 910 LPRINT CHR$ (27);CHR$ (13);
"P";
 920 FOR N=1 TO 4
 930 LPRINT "0123456789";
 940 NEXT N
 945 LPRINT CHR$ 13;CHR$ 10;
 950 LPRINT
 960 FOR N=1 TO 8
 970 LPRINT N
 975>LPRINT CHR$ (13)
;CHR$ (10);
 980 NEXT N
```

```
 990 LPRINT CHR$ (27);CHR$ (9);C
HR$ (10);
1000 LPRINT CHR$ (27);CHR$ (11);
CHR$ (5);"A";
1010 LPRINT CHR$ (27);CHR$ (9);C
HR$ (20);
1020 LPRINT CHR$ (27);CHR$ (11);
CHR$ (8);"B";
1030 LPRINT CHR$ (27);CHR$ (9);C
HR$ (30);
1040 LPRINT CHR$ (27);CHR$ (11);
CHR$ (5);"C";
1050 LPRINT CHR$ (27);CHR$ (9);C
HR$ (30);
1060 LPRINT CHR$ (27);CHR$ (11);
CHR$ (8);"D";
1070 LPRINT CHR$ (27);CHR$ (9);C
HR$ (20);
1080 LPRINT CHR$ (27);CHR$ (11);
CHR$ (5);"E";
1090 LPRINT CHR$ (27);CHR$ (9);C
HR$ (10);
1200 LPRINT CHR$ (27);CHR$ (11);
CHR$ (8);"F";
2010 LPRINT CHR$ (27);CHR$ (13);
"P";
2020 LPRINT CHR$ 13;CHR$ 10;
2025 LPRINT CHR$ 13;CHR$ 10;
3001 REM Graphics Mode - sllr11.
bas
3005 POKE 64256,0
3006 LPRINT "GRAPHICS MODE"
3007 LPRINT CHR$ 13;CHR$ 10;
3008 LPRINT
3009 LPRINT
3010 REM
3020 LPRINT CHR$ (27);"3";
3030 FOR N=1 TO 50
3040 FOR N=1 TO 50
3050 LPRINT ".";" ";
3060 NEXT N
3070 FOR N=1 TO 20
3080 LPRINT ".";CHR$ (10);
3090 NEXT N
3100 FOR N=1 TO 40
3110 LPRINT ".";CHR$ (8);
3120 NEXT N
3130 FOR N=1 TO 15
3140 LPRINT ".";CHR$ (27);CHR$ (
10);
3150 NEXT N
3160 NEXT N
3170 POKE 64256,1
3190 REM System reset
3200 LPRINT CHR$ 27;CHR$ 13;"P";
3210>LPRINT CHR$ 13;CHR$ 10;
3220 LPRINT CHR$ 13;CHR$ 10;
4001 REM Graphics Mode - sllr11.
bas
4005 POKE 64256,0
4010 REM
4020 LPRINT CHR$ (27);"3";
4040 FOR N=1 TO 410
4050 LPRINT ".";" ";
4060 NEXT N
4070 FOR N=1 TO 422
4080 LPRINT ".";CHR$ (10);
4090 NEXT N
4100 FOR N=1 TO 410
4110 LPRINT ".";CHR$ (8);
4120 NEXT N
4130 FOR N=1 TO 423
4140 LPRINT ".";CHR$ (27);CHR$ (
10);
4150 NEXT N
4170 POKE 64256,1
4180 STOP
4190 REM System reset
4200 LPRINT CHR$ 27;CHR$ 13;"P";

4210 LPRINT CHR$ 13;CHR$ 10;
4220 LPRINT CHR$ 13;CHR$ 10;
```

SAMPLE OF AUTO UNDERSCORE BY ESC E/R

SAMPLE OF BOLD PRINT BY ESC O/&

SAMPLE OF SUPER SCRIPT BY ESC D/U

SAMPLE OF SUB SCRIPT BY ESC U/D

```
LEFT MARGIN:10
1.........10.........20

          BBBBBBBBBBBBB
          aaaaaaaaaaaaa

SAMPLE OF Ø BACK SPACE.

PRINT SAMPLE OF n= 8
PRINT SAMPLE OF n= 9
PRINT SAMPLE OF n= 10
PRINT SAMPLE OF n= 11
PRINT SAMPLE OF n= 12
PRINT SAMPLE OF n= 13
PRINT SAMPLE OF n= 14
PRINT SAMPLE OF n= 15
```

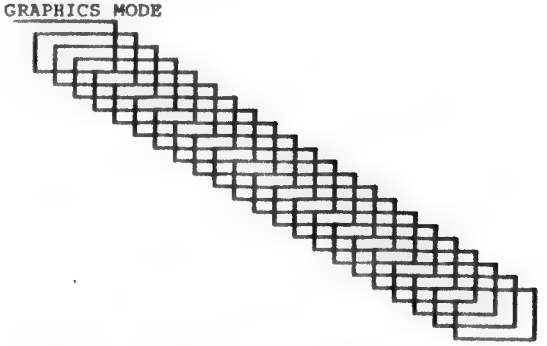
```
TAB SETTING AND CLEAR
0123456789012345678901234567890123456789

     X         X         X

SETTING LINE FEED AMOUNT
= PRINT SAMPLE OF n= 2
= PRINT SAMPLE OF n= 3
= PRINT SAMPLE OF n= 4
= PRINT SAMPLE OF n= 5
- PRINT SAMPLE OF n= 6
- PRINT SAMPLE OF n= 7
- PRINT SAMPLE OF n= 8

ABSOLUTE TAB SET
0123456789012345678901234567890123456789
1
2
3
4
5         A              E         C
6
7
8         F              B         D
```

GRAPHICS MODE



ADDING GRAPHIC PRINTER COMMANDS TO MSCRIPT FOR PROWRITER

>0=14/0,#2=15,0 ELONGATED ON/OFF

>#5=27/0 ESCAPE must be added before any of following commands

>#!=33/0,#"=34/0 BOLD ON/OFF

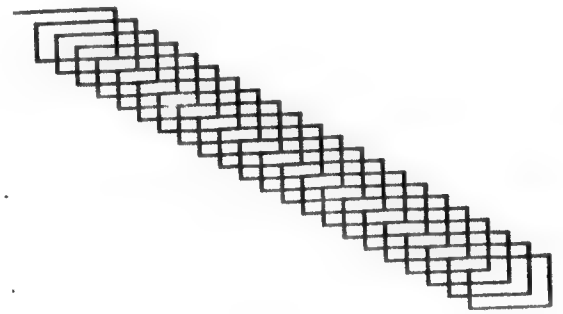
>#E=69/0,#X=88/0,#Y=89/0 ELITE and UNDERLINE ON/OFF

>#N=78/0PICA PITCH and #Q=81/0is COMPRESSED PITCH

MSCRIPT allows you to define up to ten (10) special printer codes at a time. This is done in a format line:

>#0=14/1,#!=33/0,#2=15/0 and so on.....

The ">" tells MSCRIPT that we are giving it a printer command. The "#0=" tells it we are defining a code that will follow (FUNCT)-G as the number "0" (it could be any number from 0 through 9 and/or an ASCII character). "33" is the decimal value of the character ! on the PROWRITER printer. "/1" tells MSCRIPT that the code "33" produces a printable character. Non-printable characters will be followed by "0" and MSCRIPT will ignore them when justifying text.



Robert Gilder

```
  1 POKE 64256,0: LPRINT CHR$ (
27);CHR$ (70);"THIS IS PICA PIT
CH....Pica pitch"
  2 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  3 LPRINT CHR$ (27);CHR$ (69);
"THIS IS ELETE PITCH....Elete p
itch"
  4 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  5 LPRINT CHR$ (27);CHR$ (81);
"THIS IS COMPRESSED TYPE....Com
pressed type"
  6 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  7 LPRINT CHR$ (27);CHR$ (80);
"PROPORTIONAL SPACING BETWEEN C
HARACTERS....Proportional spaci
ng"
  8 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  9 LPRINT CHR$ (14);"ELONGATED
 TYPE IS QUITE USEFUL....Elonga
ted"
  10 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  11 LPRINT CHR$ (15)
  12 LPRINT CHR$ (27);CHR$ (33);
"THIS IS BOLDFACE TYPE....Boldf
ace"
  13 LPRINT CHR$ (27);CHR$ (34)
  14 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  15 LPRINT CHR$ (27);CHR$ (88);
"SEE--IT REALLY IS UNDERLINED!"

  16 LPRINT CHR$ (27);CHR$ (89)
  17 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  18 LPRINT CHR$ (27);CHR$ (82);
"100";"*"
  19 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  22 LPRINT CHR$ (27);CHR$ (35);

  23 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  24 FOR I=27 TO 92
  25 LPRINT CHR$ (I);
  26 NEXT I
  28 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  30 LPRINT CHR$ (27);CHR$ (38);

  31 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  32 FOR I=27 TO 95
  33 LPRINT CHR$ (I);
  34 NEXT I
  35 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
  36 LPRINT CHR$ (27);CHR$ (36)
  40 STOP
```

```
THIS IS PICA PITCH....Pica pitch

THIS IS ELETE PITCH....Elete pitch

THIS IS COMPRESSED TYPE....Compressed type

PROPORTIONAL SPACING BETWEEN CHARACTERS....Proportional spacing

ELONGATED TYPE IS QUITE USEFUL....Elongated

THIS IS BOLDFACE TYPE....Boldface

SEE--IT REALLY IS UNDERLINED!
```

TASWORD II CUSTOMIZED GRAPHICS

C/S KEY	ASCII	PROWRITER 8510	ASCII	KEY
1	14	ELONGATED TYPE	15	1
2	33	BOLDFACE TYPE	34	2
3	88	UNDERLINE TEXT	89	3
4	78	PICA PITCH	.....	
.....		ELITE PITCH	69	4
5	81	COMPRESSED	.....	
.....		PROPORTIONAL	80	5
6	91	INCREMENTAL	.....	
.....		BACKSPACE	88	6
7	35	PRINT GRAPHICS	.....	
.....		ALPHANUMERICS	36	7
8	93	LOGIC SEEKING	.....	
.....		UNASSIGNED		8

List Group

FOR SALE: One Derco 2068 centronics printer interface - new with software and documentation. Not used

Asking $55 US OR $75 Canadian. Includes shipping

MR. RENATO ZANNESE
615 RODING ST. DOWNSVIEW
ONTARIO, CANADA M3H 2A6

TASWORD TWO CUSTOMIZED GRAPHICS

SILVER-REED EXP400

ASCII	PRINTER CODE & FUNCTION		KEY
128	27,30,8	LINE FEED CHANGE	8
129	27,79	BOLD PRINT ON	1
130	27,69	UNDERLINE ON	2
131	27,68	SUPER SCRIPT ON	3
132	27,85	SUB SCRIPT ON	4
133	27,31,15	HORIZ PITCH ON	5
134	27,3	GRAPHICS ON	6
135	8,47	BACK SPACE - 0	7
136	27,13,80	RESET PRINTER	C/S 7
137	27,4	GRAPHICS OFF	C/S 6
138	27,31,12	HORIZ PITCH OFF	C/S 5
139	27,68	SUB SCRIPT OFF	C/S 4
140	27,85	SUPER SCRIPT OFF	C/S 3
141	27,82	UNDERLINE OFF	C/S 2
142	27,38	BOLD PRINT OFF	C/S 1
143	27,30,9	LINE FEED NORMAL	C/S 8

T/S 2068 BANK SWITCHING, PART 2

Welcome back. The first installment might have given you the idea that knowing machine code was necessary for understanding bank switching. Would I do that to you? On occasion, machine code will be presented to support "fixes", but if you don't actually make the fixes you can skip it without any loss.

We previously discussed how to fix a statement like: CLOSE #3 when new devices had been added. "C" for a CENTRONIX printer is a typical example. The OPEN statement pulls an error which can be trapped with ON ERR. Fixing this type of problem is quite simple. The error number and location are available in the system variables.

OPEN #3,"C" is sufficient syntax if patches have been made to the CHAN5 table, or a new channel has been inserted.

The complete syntax for OPEN goes beyond this. The statement for an EXBU floppy disc drive, bearing a BEU chip is:

OPEN #7;"D",[parameter list]

The parameter list includes such information as drive number, disc label, filename, extension, disc format standard, and file attributes. This syntax is common to all bus expansion units. Different devices require different parameters, of course.

Does this give you the idea that you can read, say, an IBM formatted disc? Yup, but it won't be easy until the interface routines become available.

What an OPEN statement does is to verify the presence of the device, then post the offset to STRM5 pointing to either CHAN5 or SYSCON as appropriate. In the process, a device dependent OPEN routine is generally required--just as for CLOSE.

The key here is "the presence of the device". That is where bank switching begins.

When you turn your computer on, it goes through a lengthy initialization process to make it possible to do all those wonderous things. Just before the copyright message appears, the bank switching system is invoked to search out and identify what is connected: and to prepare a sorted list of them. That list is the system configuration table (SYSCON).

Ah! There is more to this bank switching than you thought! Cartridges which plug into the dock have reserved places at the bottom of SYSCON; one for ARO5 and one for LRO5 types.

Does it make more sense now, that this article began with I/O? It was necessary to put in perspective what bank switching does, before showing how it works.

It is still too early to explore how it works, but in the interest of fairness, a short description is in order.

The bank switching controller (BSC) resides in the SCLD. It can be reached directly through the I/O system and indirectly by issuing orders to MACROs in the SCLD. The indirect route uses memory mapped I/O and "doubletalk" which is almost magical. The SCLD MACROs issue lots of instructions to the BSC for each order received, so it pays to use them. They also perform other tasks involving the CPU.

The bank switching system has a separate data bus all its own. This consists of four lines from the joystick port (which transfer "nibbles") for data, and one line which steers the data to a LSn or MSn register. Data is transferred a byte at a time, taking two cycles per transfer. While doing this, the SCLD turns off the CPU clock, leaving the CPU frozen in time with all its signals maintained, active or passive.

This solves the problem of being interrupted. The SCLD takes over most of the computer. When the MACRO task is complete, the clock starts running again without the CPU being aware that the lapse has occurred.

Bank switching control lines include DZOUT, DZIN, and BUSISO. Though CPU lines are "frozen", the address lines A13 to A15 can be borrowed and used as function selectors. Anyone interested in learning more about peripheral control systems can find the IEEE 488 standard in their libraries or in the INTEL manual.

None of the control lines are connected in the TS2068. We'll cross that bridge when we come to it. For now, we'll assume all signals are available.

Every BEU has an Identification Number (ID) which it recognizes when it appears on the bank switching data bus. It responds by sending DZIN. No two devices can have the same ID and zero is not allowed. The BSC polls from 1 to 255, stopping when DZIN is sensed. In this way it finds all attached devices, one at a time. It returns control to the CPU each time.

The CPU tests the bank for being RAM or ROM and creates an entry for it in the SYSCON table. All RAM is treated alike, but ROM is prepared for sorting. Before going on, the BEU is told to recognize its position in the SYSCON table instead of its ID.

The XFER_BYTE5 routine in chunk 3 lets the CPU get data from chunk 0 of the bank into the SYSCON table, using bank switching of course. Only one byte is needed to test if it is RAM. For ROM, the first 22 bytes are copied into SYSCON. If the device is not an EXBU, these bytes (and others perhaps) belong to the BEU chip. The data is used for initialization, but the device is never bank switched. This is the case with most printers and the better implementations of DOS systems.

Those first 22 bytes of ROM carry all the information needed to identify and operate the device. Some devices are not ROM, requiring additional testing to identify them.

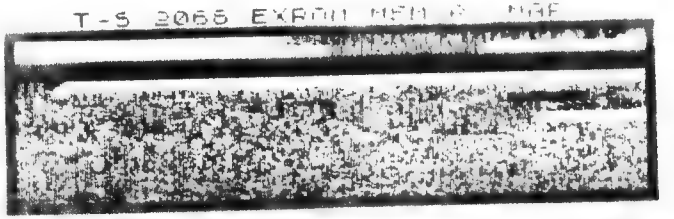
Once the table is complete, and all BEU's are recognizing the new assigned bank numbers (ABN), it is sorted according to the priority read in byte 22, lower numbers mean higher priority to be placed near the bottom of the SYSCON table. RAM is given a priority of 255 so it is always above any ROM entries. Devices which have handling routines in the HOME ROM are at the bottom. NonEXBU devices come next, then EXBUs. It was planned to accommodate thirteen different devices, but which has not been said. RAM banks are loaded with the interrupt handler from the EXROM.

The last phase of initialization is the posting of nonEXBUs to CHAN5 and posting that fact back to SYSCON.

THEN--the copyright notice appears.

Next we will look a lot more closely at that SCLD, examining its power and limitations, but not now. Yes, the system will be summarized, but not until the final article in the series.

Complicated isn't it? Like life, it's "verrrry interesting."



ATARI KEY PAD

NOTE: We mentioned last month that you could get one of these 12 button pads, which are similar in profile to the TS2068, for 50¢ at local Odd-Lot stores (as part of the Star Raiders package for the ATARI 2600 or VCS). Experimentation has since shown that pin 8 is not connected. This pin is the $\overline{STB}$ line on the 2068's left and right joysticks and is the essential line required by STICK. As such, the pad cannot be used directly with a 2068. Modifications to the 2068 and/or replacement of the pad cord are required if you intend to use the pad. Further, unless you're willing to do some sophisticated rerouting and I/O software development, it is unlikely that more than 10 of the buttons can be effectively used. We'll be publishing a detailed "Hackers Notebook" item on this unit next month. At 50¢ we still think the STAR RAIDERS package is a good source for experimenters parts.

HACKERS NOTEBOOK

ATARI KEY PAD (STAR RAIDERS)

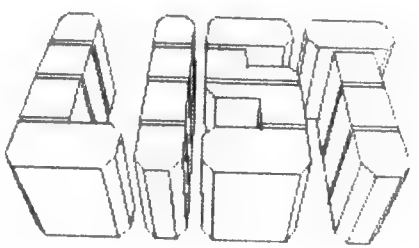
The attached page one gives the schematic for the ATARI Key pad and 2068 joystick (a fairly standard joystick configuration). Note that line 8, $\overline{STB}$ is the one key pin missing from the key pads plug. This makes the pad useless as a simple input device. Still, there are several inexpensive ways around this problem. Some of these will be illustrated here and others, requireing somewhat more advanced skills, will be suggested.

A glance at page 1 of 2 shows that the standard ATARI or TS 2068 joystick uses 5 data lines and one strobe to send data into the computer. The strobe line on some machines is simply ground or +5V on many machines, the important thing to remember is that it is the "common" connector. Crossing any one of the 5 data lines (up , down, left, right, Fire) with the common, or strobe, line pulls that line low (on our machines, $\overline{STB}$ is an active low line). The Input/Output (I/O) port in the 2068 reads the 5 data lines and latches the bit pattern of D_0 D_1 D_2 D_3 (directions) and D_7 (fire) into the Programmable Sound Generator (PSG) chip. The STICK command reads the I/O ports in the chip, manipulate the data slightly, and returns a value (2,4,8 or 12 for the 4 compass points) to the BASIC for your program to use. $\overline{STB}$ is actually a different line on each joystick. The left is A8 (address line #8), the right, A9.

STICK is thus a sophisticated IN routine. Compare the use of STICK and IN in the attached joystick test program. If you type this in, you'll find that STICK is somewhat faster. This is because the IN lines must each be interpreted by BASIC, one at a time. STICK does the equivalent of several functions at once. The trade-off for this sophistication is a loss of speed, as you've seen, and flexibility. IN reads all 5 data lines and report the results as a single Byte (e.g., 128=FIRE, 129=FIRE & UP)

Since $\overline{STB}$ isn't connected on the ATARI key pad, we need some other way to read which switches are closed. A look through the 2068 tech manual tells us that all the data lines are latched high on start up. When resister 14 of the PSG is read (for STICK, or certain IN addresses) the appropriate $\overline{STB}$ line is brought low. If the joystick is activated, a data line contact is made with $\overline{STB}$, and the appropriate data (DN) line is brought low. The ROM software reads this and passes a parameter to BASIC, which is then used by your program.

We can make a data line go low just as easily by grounding it. Again, however, there are trade-offs and problems. By using ground we've lost our ability to tell which (left or right) joystick is responding. (E.g., if A8 is low and the right fire button is pushed a normal STICK command will not read it). Still, if we only need to monitor one joystick (5 data inputs), this will suffice. We tried this and nothing happened.



It appears that in most 2068's, the joystick port ground line is not connected. In order to use the ATARI key pad, we had to connect the ground line on our joystick port. This is a fairly simple procedure, involving soldering a short piece of wire from pin 9 to a nearby ground. For the left joystick, the negative side of the nearby Electrolytic capacitor works fine. Be very careful when soldering to the joyports legs, however. These are two unconnected pins in the inner row of four, you want the one closest to the front of the machine. We found it easier to remove the whole circuit board to do this job, as you must work around the outer row of 5 pin. Be careful not to short any lines together.

The ATARI pad, as can be seen from page 1 of 2, uses a 3 X 4 (3 columns by 4 rows) matrix to read the twelve touch pads. Our simple ground = $\overline{STB}$ setup gives us a potential 1 X 5 array. If we don't modify the circuit traces of the key pad (see pg. 2 of 2), the least we can do is read the 4 row inputs in one column or the 3 columns for 1 row. The later is practical for many platform games, where left, right and jump are the only moves required. Page 2 of 2 shows how the internal clip-on pugs of the ATARI keypad were changed in order for us to read row 3's 3 buttons as left, fire and right (reading from L to R). Depending on the software, this setup should work with commerical programs which use one joystick, as well as it does in our BASIC test program. The new configuration of the port, of course, ignores whatever the software is trying to do with A8 and A9 and simply reads that the data line is grounded. We've lost port selection and some more esoteric features like software debounce, but these may not be a problem in your application Note that this modified pad will only work on a port with pin 9 grounded. Do not try to use the modified pad on an ATARI or Spectrum joystick interface. At best, it will not respond, at worst it could short out the machine. Finally note that the keypad has 2 - 4700 Ω pullup (down ?) resistors crossing two of the column lines. One end of each of these must be unsoldered or cut. The keypad modifications are shown on page 2 of 2.

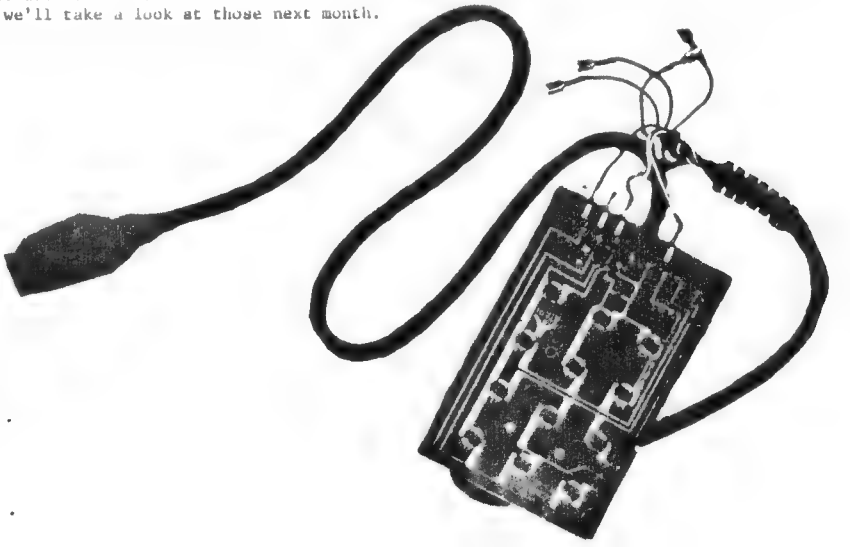
ADVANCED TOPICS

Since there are two X 5 lines, or 10 data lines, on the PSG, it is possible to rewire the 2068 and keypad to scan 10 of the buttons. This would provide a handy numeric keypad (using STICK), for the digits Ø then 9. We need, of course to hook up strobe and this where the incomplete wiring of the 2068 may actually help us. On the left joystick port We connected ground where it should be to use a single row of the keypad. We could modify the right side port, which is use less frequently, to read all 5 data lines on either joystick.

This can be accomplished as follows: (not tested)

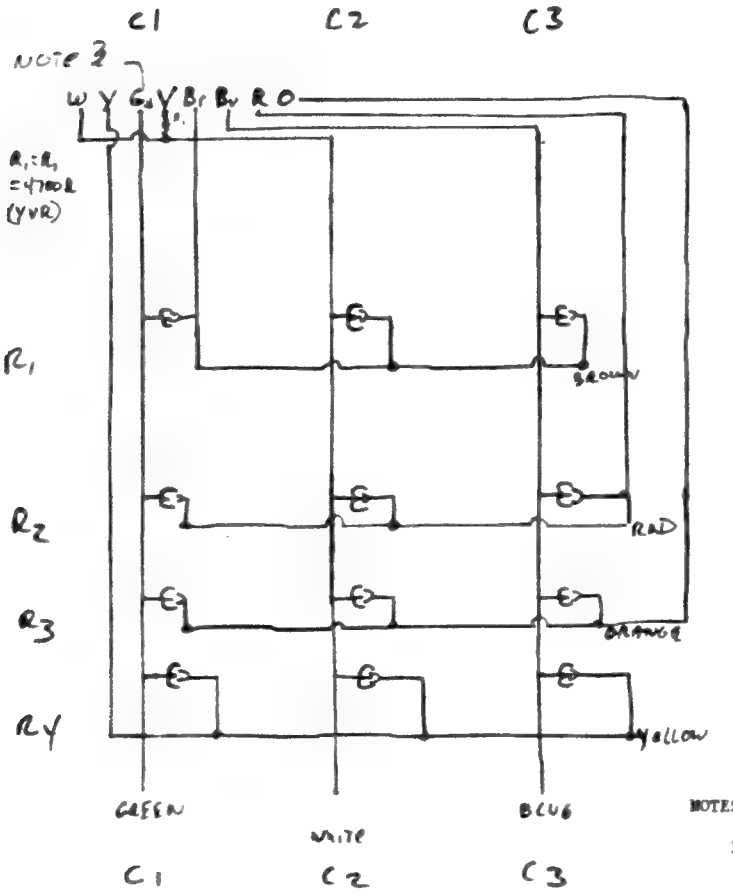
Connect a jumper from A8 on the left port to pin 5 of the right port. Connect a jumper from A9 on the right port to pin 9 on the right port. This should not effect operation of a normal 6 wire joystick (U,D,L,R, Fire and ground wire only-check the plug). It does, however, provide both the A8 and A9 Strobes to pins which the ATARI key pad can read. You must also modify the foil pattern of the key pad circuit board to match a 2 X 5 matrix. This involves cutting some traces and adding a few jumpers. Write interrupt drivers software, following the example in the tech manual) which scans your new key pad automatically. Spray paint the pad silver if you have a 2068, and add bigger rubber feet to match the 2068's slope and you've got a sophisticated "dedicated numeric keypad".

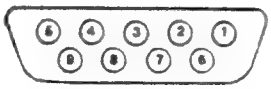
There are other ways to make this unit more useable with your 2068 and other computers and we'll take a look at those next month.

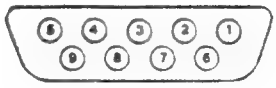


Engineering Chart Sheets

Subject ATARI TOUCH PAD + TIMEX JOYSTICK ORIGINAL MATRICES







ATARI PAD PLUG		PIN	JOYSTICK PLUG (TYP)	2068
R1	BR	1	U	D3
R2	Rd	2	D	D2
R3	OR	3	L	D1
R4	YL	4	R	D0
C1	GN	5	F1	-
C3	BU	6	F2	D7
+	VI	7	-	+5 ?
n/c	n/c	8	STB	STB
C2	Wh	9	- NOTE (1)	÷ ?

NOTES:

1) Power &/or Ground may not be connected on your machine. Grounding in particular may not be connected.

2) The absence of a connection on pin 8 of the ATARI touch pad makes it unsuitable for use with the TS 2068 joystick ports (or as a joystick, per se, for any ATARI compatible).

3) Removal of pullup resistors is probably required.

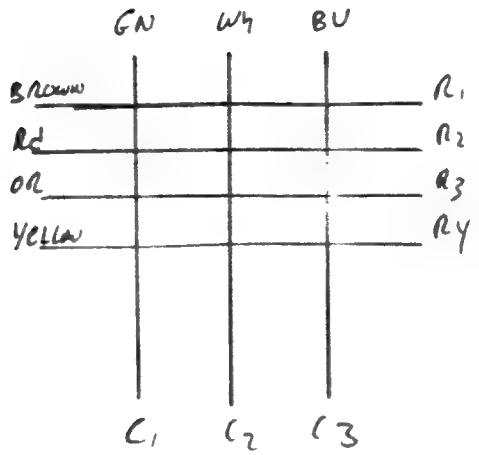
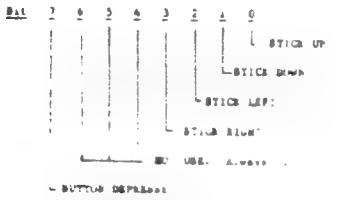


TABLE 7.6.6-1

JOYSTICK CONNECTOR SIGNAL ASSIGNMENT

P/N	SIGNAL NAME	I/O PORT BIT	FUNCTION
1	DIR1	0	STICK UP
2	DIR2	1	STICK DOWN
3	DIR3	2	STICK LEFT
4	DIR4	3	STICK RIGHT
5	---	---	not used
6	BUTTON	7	Push BUTTON
7	5V	---	5 VOLT POWER
8	READ STROBE	---	Address BIT 8 ON VP
9	GND	---	POWER GROUND

When address bit 8 is high the READ strobe to the left joystick is driven low. When address bit 9 is high the READ strobe to the right joystick is driven low.



Sheet No. 2 of 2
File JOYSTICK

Engineering Chart Sheets

App.

Subject ATARI TOUCH PAD - MODIFICATION #1
LEFT / RIGHT & FIRE (JUMP)

Date

By 2/4/86

USE LEFT JOYPORT ON TS2068

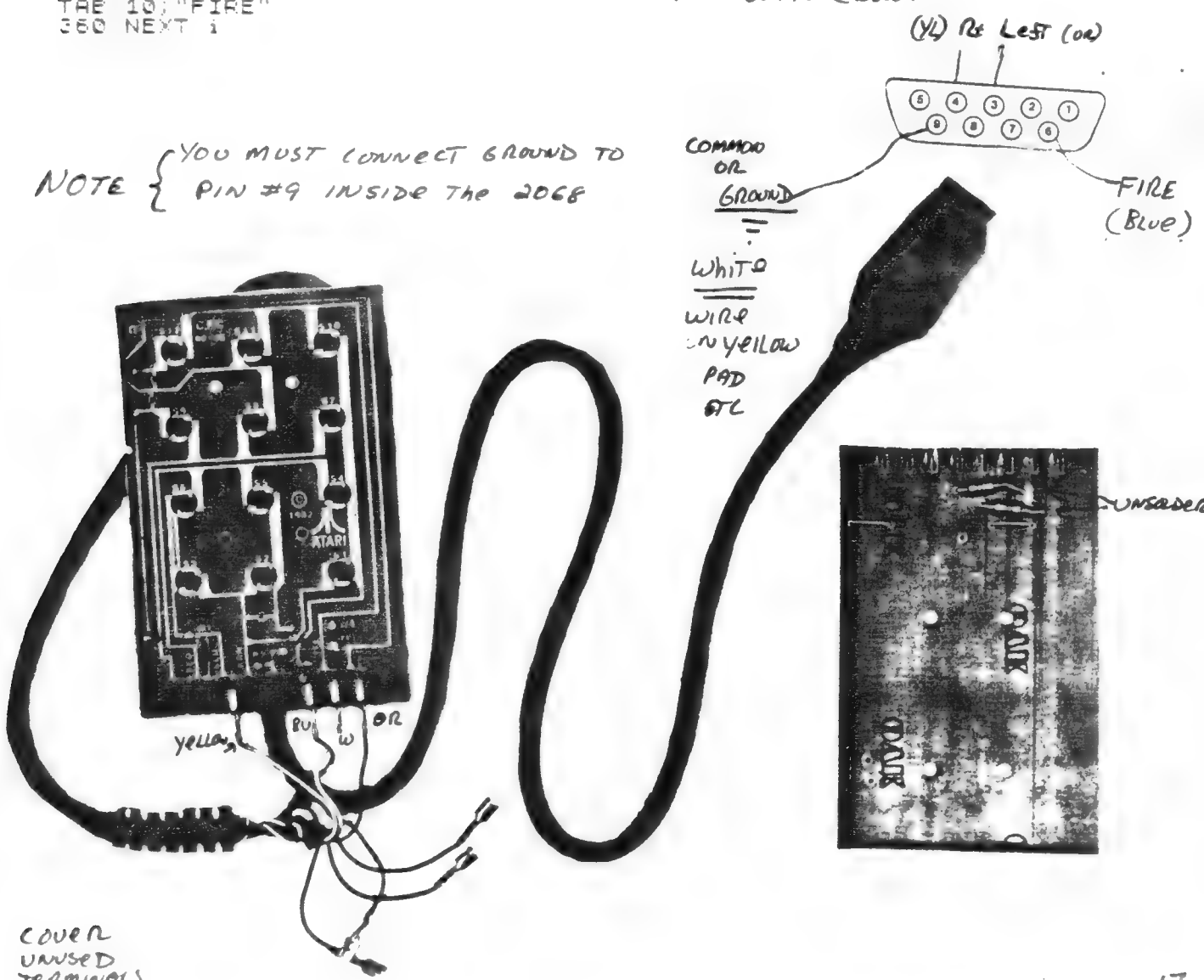
```
 10 FOR i=1 TO 700
 20 PRINT STICK (1,1);
 30 NEXT i
 89 STOP
 90 FOR i=1 TO 700
100 OUT 248,14
110 LET s=255-IN 248
120 PRINT s;
130 NEXT i
200 OUT 248,14: OUT 248,255
299 STOP
300 FOR i=1 TO 200
310 IF STICK (1,1)=4 THEN PRINT
"Left"
320 IF STICK (1,1)=8 THEN PRINT
TAB 20;"Right"
330 IF STICK (2,1)=1 THEN PRINT
TAB 10;"FIRE"
360 NEXT i
```

} NORMAL STICK - PAD WILL GIVE 4=L ; 8=R

} INPUT FIRE = 128; 4=L ; 8=R

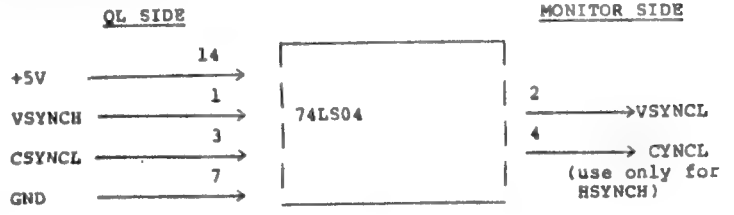
PAD WILL PRINT
LEFT, RIGHT OR FIRE
FOR BOTTOM ROW.

NOTE { YOU MUST CONNECT GROUND TO PIN #9 INSIDE THE 2068



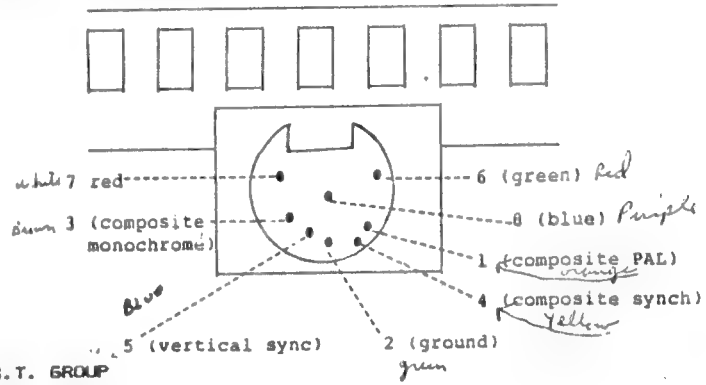
COVER UNUSED TERMINALS W/TAPE INDIVIDUALLY

The Sync signals vary from monitor to monitor. Usually, monitors which ask for Horizontal Sync will accept Composite Sync, so it is merely necessary to invert the Sync signals if they are of different polarities to those provided by the QL (this is sometimes required for both syncs, sometimes for one, and sometimes for neither). On U.S. QL's where the +5V signal is provided on the DIN connector, this can be done with a signal IC: the easiest is a 74LS04, but many other IC's can be used with appropriate adjustment to the pin-out.



Pin	Function	Signal	Wire Color	Signal Level
1	PAL	composite PAL	orange	1V pk-pk into 75 ohms
6-2	GND	ground	green	
3	VIDE	composite monochrome video	brown	1V pk-pk into 75 ohms
7-4	CSYN	composite sync	yellow	0-5V TTL (active low)
9-5	VSYN	vertical sync	blue	0-5V TTL (active high)
3-6	GREE	green	red	0-5V TTL (active high)
2-7	RED	red	white	0-5V TTL (active high)
4-8	BLUE	blue	purple	0-5V TTL (active high)

Diagram of Monitor Connector as Viewed from rear of QL. Showing pin number and functions:



L.I.S.T. GROUP
P.O. BOX 438
Centerport,N.Y. 11721-0438

Dear L.I.S.T.;

Thanks for including me on the Library tape mail list. I was pleasantly suprized when I recieved it. I now have increased my system; TS2068,ZEBRA DDS & 2 DD,STAR SG-10 Printer,2050 Modem,Tasman I/F,and NOW the QL and an RGB monitor. I need some help with the RGB conecting cable to a

TECHNICAL SPECIFICATIONS

Picture Tube Type	13 diagonally measured
Deflection Angle	90
Video Input Signal	Composite Video 1Vp-p negative sync phono connection type TTL level digital video separate horizontal and vertical syncs
Horizontal Resolution	390 dots (RGB)
Character Field	25 lines of 80 characters (2000 into
Audio Input Level	Up to 150mV phono connector type
Audio Output Level	Up to 1W @ 5% distortion
Power Supply	120Vac ± 10%, 50-60Hz
Power Consumption	75 Watts Maximum
Dimensions (H x W x D)	320 x 350 x 387mm

In support of our policy of continuous product improvement the abov specifications are subject to change without notice

SAFETY PRECAUTIONS

A Do not place objects on top of the monitor cabinet which could fal into vents or which could cover them and prevent proper cooling o the monitor s electronics

B To reduce the risk of fire or shock never expose the monitor to ra or excessive moisture

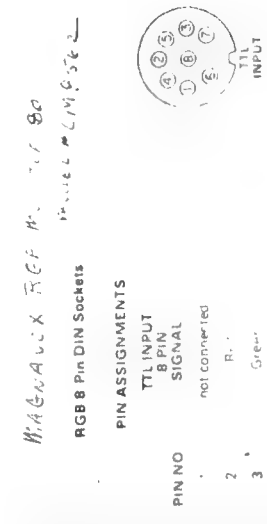
C Do not place your monitor where sunlight or bright room light w fall directly on the screen

D When necessary clean the cabinet with a damp cloth Use only mild detergents Do not use alcohol or ammonia based products

E Unplug the AC cord from the outlet if the monitor is not to be used f an extended pe

User Maintenance Caution

There are no user serviceable parts inside the monitor s cabinet Do attempt to remove the cabinet back as you will be exposed to a sh hazard



CAUTION
This monitor generates and uses radio frequency energy and if not installed and used properly that is in strict accordance with the manufacturer s instructions may cause interference to radio and television reception It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules which are designed to provide reasonable protection against such interference in a residential installation However there is no guarantee that interference will not occur in a particular installation If this does cause interference to radio or television reception which can be determined by turning the equipment off and on the user is encouraged to try to correct the interference by one or more of the following measures

reorient the receiving antenna
relocate the computer with respect to the receiver
move the computer away from the receiver
plug the computer into a different outlet so that the computer and receiver are on different circuits

If necessary the user should consult the dealer or an experienced radio television technician for additional suggestions The user may find the following booklet prepared by the Federal Communications Commission helpful How To Identify and Resolve Radio TV Interference Problems This booklet is available from the U S Government Printing Office Washington D C 20402 Stock No 004 000 00345 4

QL ie. (REDtoRED, GREENtoGREEN, BLUEtoBLUE, VERT.SYNCtoVERT.SYNC.)

I followed the directions in the QL fact sheets sent with the QL, that is the HORIZ. SYNC. on the monitor would accept the COMPOSITE SYNC from the QL. This left the COMPOSITE MONOCHROME and COMPOSITE PAL and I could not decide which should go to the monitor pin 5-INTENSITY or pin 1-NOT connected. When plugged in all I got was a constant Vertical roll but when the COMPOS. MONO. was conected to the 5 pin and the HORZ. SYNC. or VERT. SYNC. I got a VERT. roll that would stop for a min. or two then start

Sincerly
William P. Allen

William P. Allen
P.O. Box 325
Islip Terrace, N.Y. 11752

L.I.S.T. GROUP
ROBERT GILDER
69 Jefferson Place,
Massapequa, n. y. 11758
February 16, 1986

Mr. William P. Allen
P. O. Box 325
Islip Terrace, N. Y. 11752

Dear Bill;

I read your letter to LIST and will attempt to help you sync your QL computer with your Magnavox R08 monitor.

Specs from a European QL indicate that the QL provides positive vertical syncs and negative composite/horizontal syncs.

From the technical specifications you included with your letter for the Magnavox monitor, composite video requires negative syncs , but no mention of polarity for horizontal and vertical syncs. It also appears that your hookup from the QL to the monitor is correct which leaves me to believe that one or both sync inputs to the monitor may require inversion, especially since an inverter circuit was provided with the QL.

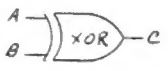
I have enclosed a circuit which I use often for sync polarity inversion; using a 74LS86 quad EXCLUSIVE OR gate. The only difficultly you may have is to provide the IC with + 5 VDC operating voltage. The fact sheet for the QL which you supplied us with states that on US version of the QL +5 VDC is available at the DIN connector. I am assuming that your QL is European with PAL composite video because pin one of the DIN connector indicates PAL. You may be able to "steal" 5 volts from your monitor or a small regulated power supply can be built to power an inverter circuit.

The Sinclair circuit using a 74LS04 Hex Inverter has been redrawn to simplify the circuit assembly.

Either circuit should provide you with proper inversion of one or more sync signals, however the 74LS86 circuit which requires an addition of 4-1K resistors will allow you to change sync polarity while the computer and monitor are operating.

As a point of interest, the following TRUTH TABLE for the 74LS86 XOR IC will provide an insight to how the IC performs inversion.

A	B	C
1	1	0
1	0	1
0	1	1
0	0	0



Note: A & B are inputs , C is the output.
1 is a logic high, 0 is logic low.

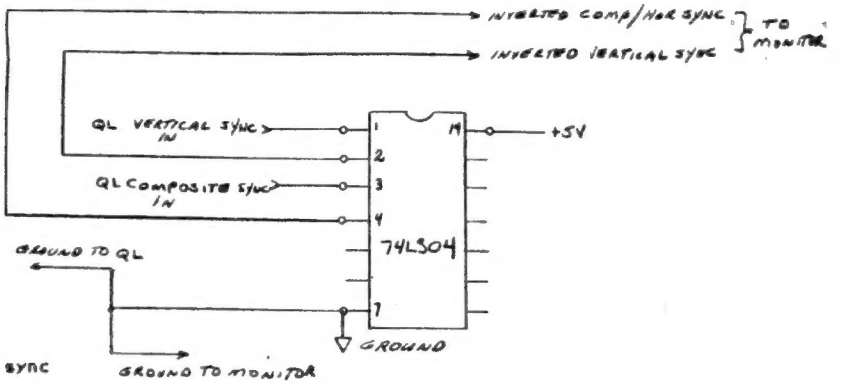
If inputs A and B are either at a logic high or low (1 or 0) then the output from the gate is low (0). If either input A or B is high and the other input is low, then the output will be high (1).

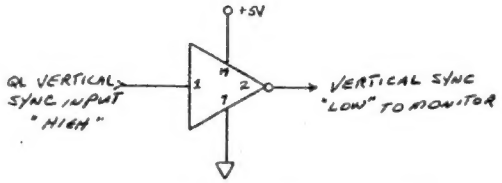
The schematic will indicate that both gate inputs for each gate used are held at logic high with 2-1K resistors. Signal inputs will appear on IC pins 2 and 12. If your computer and monitor are operating and the image is rolling, simply placing IC pin(s) 1 and/or 13 at ground potential using a short section of hook up wire will invert the signal to your monitor. When the right combination of polarity is found, solder a jumper from the gate input to ground.

If you still have a problem, you can call me at home most evenings between 7:30 and 9:00 at 516-541-2271 or you may consider attending our next LIST meeting at the Huntington Library with your QL and Monitor.

Best of luck

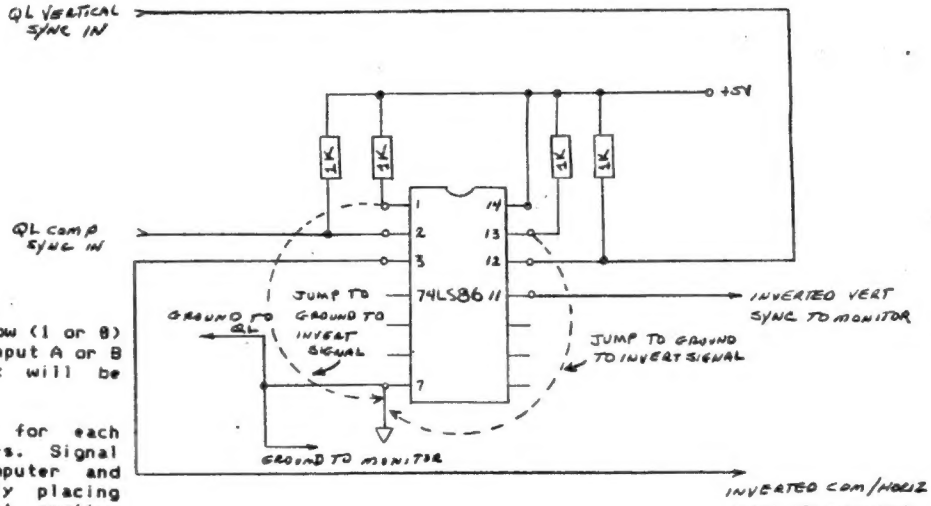
Bob Gilder

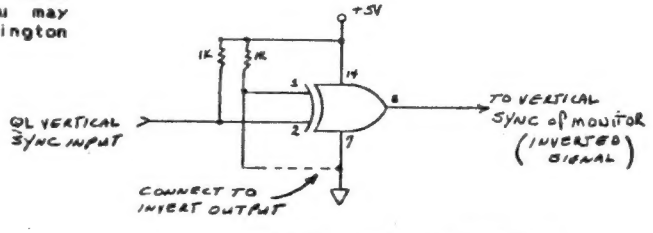




74LS04 HEX INVERTER

L.I.S.T.





74LS86 EXCLUSIVE OR GATE

April

Joe C. Smith Jr.
P. O. Box [illegible] FLORENCE AL 35630

Mr. Paul Donnelly
Box 438
Centerport, N.Y. 11721

Dear Mr. Donnelly:

I have enclosed a copy of the book '200 Computer Programs in BASIC for the T/S-1000 Z/X-81 T/S-2068'.

I hope you will enjoy using the many fine programs which are listed in it.

At $7.95 a copy. I feel I succeeded in my endeavor to offer a large quantity of good original programs at a very inexpensive price to fellow T/S owners and users.

As you will see, offering the book in a binder format will allow purchasers to store their own programs at the back of the book. I feel this is a good idea.

I am thinking about compiling another Software book for the T/S computers. If you would like to submit someone programs I will include them in the second book with the same agreement as before.

Again, Thank You.

Sincerely:
Joe C. Smith Jr.
Joe C. Smith Jr.

Here are some samples of the Programs in Joe's New Book We'll review it in an up coming issue of LISTing

"RENUMBERING ROUTINE"

Attach these lines to the end of a basic program. Enter GOTO 9991- in the immediate mode - and the computer will renumber any basic program counting in intervals of 5.
If you wish to change the numbering interval, change the value of N and the 5 in line 9995.
Remember to change GOTOs and GOSUBs after the program has been renumbered.
Created by: Steven Kaye; Submitted by and with permission from the ZX USERS Group of New York.

```
9991 LET B=16509
9992 LET N=5
9993 POKE B,INT (N/256)
9994 POKE B+1,N-256*INT (N/256)
9995 LET N=N+5
9996 LET B=B+1
9997 IF 256*PEEK B+PEEK (B+1)=9990
THEN STOP
9998 IF PEEK (B-1)=118 THEN GOTO 9
993
9999 GOTO 9996
```

Some of the Programs are 100's of lines long & they cover everthing from math to games to domestics.

"64 CHARACTERS"
AND A CLEAR SCREEN

Use this program in conjunction with your users manual. This is the way you begin to work with 64 characters on the screen. You need to shuffle everything around inside the computer's RAM memory and that is exactly what this routine does. Follow the prompts in the REM statements and you should not have any troubles.
Created by: Doug Dewey of Triangle Users Group, North Carolina; Submitted by and with permission from the ZX USERS Group of New York.

```
 1 REM This program allows the user
to reallocate various different
components of RAM memory and make
way for a clear screen in the 64-
character mode. See page 254 for
the different display file/memory
maps and pages 247 and 248 for the
codes for variable b.
 2 REM Call this routine by PRINT
USR 63000
 5 CLEAR 62999
 7 PRINT "Please input b": INPUT b
10 LET a=63000
20 READ n: POKE a,n
30 LET a=a+1: GOTO 20
40 DATA 243,62,1,211,244,219,255,2
03,255,211,255,62,b,245,251,205,14
2,14,243,219,255,203,191,211,255,1
75,211,244,241,254,128,3,2,3,50,19
4,92,251,201
```

"ANAGRAM"

This program will make GOOD and BAD Anagrams of words you Input. It will fit in 1K.
Created by: Jody Koenig; Decorah, Iowa.

```
 1 REM ANAGRAM
10 INPUT A$
15 DIM D(LEN A$)
17 LET A=1
20 FOR C=1 TO LEN A$
30 LET X=INT (1+LEN A$*RND)
40 FOR B=1 TO LEN A$
50 IF X=D(B) THEN GOTO 30
60 NEXT B
70 PRINT A$(X)
72 LET D(A)=X
75 LET A=A+1
80 NEXT C
85 PRINT
90 GOTO 15
```

Cedric R. Bastiaans

Mt. Sinai, NY 11766

15 February, 1986

Dear Paul,

Sorry about printing my name in such obnoxiously large letters; I unwittingly left the print mode of my typewriter in the expanded font.

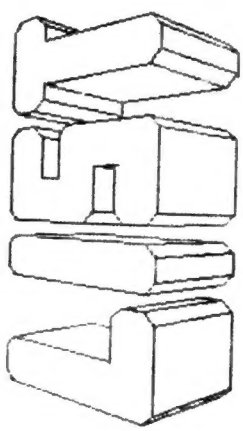
Please find enclosed two prints of a LIST-logo, that you might find interesting. If you think that one or both of them could "beautify" our News Letter Heading, feel free to use them.

I created them on VU-3D and the sectioned version just about eats up all of the available RAM!

I have the data on disk, as well as the screen$ of these particular depictions.

If you like them, and you wanna use them, but also need other sizes, let me know of your needs and I will crank out a few more.

Cordially,



LONG ISLAND SINCLAIR TIMEX GROUP

Annual Dues.....$15.00 Issue Price $1.50 (includes P&P) - Double Issues $3.00

One "Sample" copy sent upon receipt of large SASE.

Copies provided on exchange basis with other bona fide user groups.

L.I.S.T.ing is published monthly by LIST (Long Island Sinclair Timex) Group.
a non-for-profit users group.

NOTE: PARTIAL YEAR MEMBERSHIPS AVAILABLE

Normal membership year is Feb. through Jan. at cost of $15.00 (US) By keeping as many members as possible on that basis, we keep our costs and chances of error down.

If you wish to begin subscribing later in the year, please sign up for the end of this year and all of next.

We will accept partial years or different subscription runs, on a limited basis (particularly from members outside the U.S.) But, please be aware that, in addition to possible rate increases, your "account" must be handled "by hand" and errors may occur. International (ex Canada) subscribers will receive as many issues as we can afford to mail

A public service bulletin from Joseph E. Seagram & Sons, Inc.

POLICY OF CONTRIBUTED MATERIAL:

We are always looking for interesting articles, programs, reviews etc., to keep our members informed and entertained. Articles submitted for publishing are printed on the following basis.

1) You, the writer, maintain the full copyright and can resell, lend or give away your work, as you wish.

2) We are granted the right to publish your material, in the original issue in which it appears. Reprints (e.g., to supply orders for back issues) will include your material as a part of its original issue. We are not allowed to sell your material in any other way, without your express written consent.

   We can't (for now) pay you for your material, but you will receive a copy of the issue in which it is published, even if you're not a member. You may get more than one issue and you will definitely earn the respect and appreciation by your grateful peers.

Articles represent the opinion of the author and not necessarily the LIST Group. LIST disclaims any responsibility for anything you may do to your computer as a result of reading any article in LIST.ing.

Please note our new address - PO BOX 438, Centerport, N.Y. 11721-0438
Mail sent to the old address must be forwarded there and will take longer to reach us.

LIST

NOTE: LIST Associates is not an official organ of LIST Group

APRIL 1986

SPECIAL OFFER

TIRED OF WAITING MONTHS FOR LIBARY TAPES?

FED UP WITH POOR QUALITY PRINTING IN YOUR NEWSLETTER (CUT OFF PAGES, WASHED-OUT REDUCED PRINT, NOT DARK ENOUGH)?

WANT TO GET YOUR NEWSLETTER SOONER & WITHOUT POSTAL SERVICE DAMAGE?

LOOKING FOR PERSONAL SERVICE?

NEED A CONTACT WITH THE U.K.?

WAIT NO LONGER!

LIST ASSOCIATES, the people who first brought you cheap Spectrum ROMs and Software from the UK, are now making a special offer to LIST members.

JOIN LIST ASSOCIATES now and receive these special gold member benefits.

1. LIST newsletter mailed to your home by registered mail.
2. LIST newsletter mailed to gold members before being mailed to exchange user groups.
3. Your own private copy of each new List library tape. Yours to keep.
4. Free postage paid envelope for return of the LIST "member" tape.
5. Guaranteed readable newsletter. Only the finest copies, printed on heavy weight bond paper.
6. Reprint service at a nominal fee.
7. Personal attention to your library tape and/or newletter problems.
8. One free use of our personal answer service (answers to your questions directly from renowned experts in the field).
9. Optional, once per month, use of our answer service (Additional fees required)
10. Other special benefits yet to be announced.

LIST ASSOCIATES membership is reasonable too! We've priced out our labor force's current market value and can provide all these services, and more, for the incredibly low price of just $100/year. A one-time membership fee in List Associates of $400 is also required. Send us your check for membership and annual usage of this service before April 30, 1986 and we'll even pay your next years LIST dues - absolutely FREE!

SUPER BONUS

Date your check prior to April 1st, 1986 and we'll include a one time access to our personal answer service (a detailed response to your question) for only $25. You save 50% on the normal one time fee of $50 per request (annual rates are lower)

DON'T DELAY - JOIN TODAY!

Join the Golden Inner Circle of LIST

Send Check, Cash or Money Order to:

LIST ASSOCIATES - GOLD
PO Box 438
Centerport, N.Y. 11721-0438

DO IT NOW!

We reserve the right to [illegible] and refuse
This offer void where prohibited by law.

THIS COULD BE YOUR LAST ISSUE!

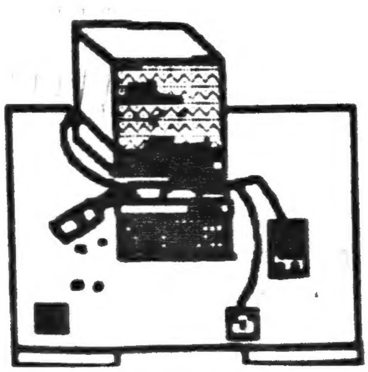
Most members (over 90%) are on a Feb. to Jan. schedule. Please double ch... the membership/subscription expiration date printed on your mailing label

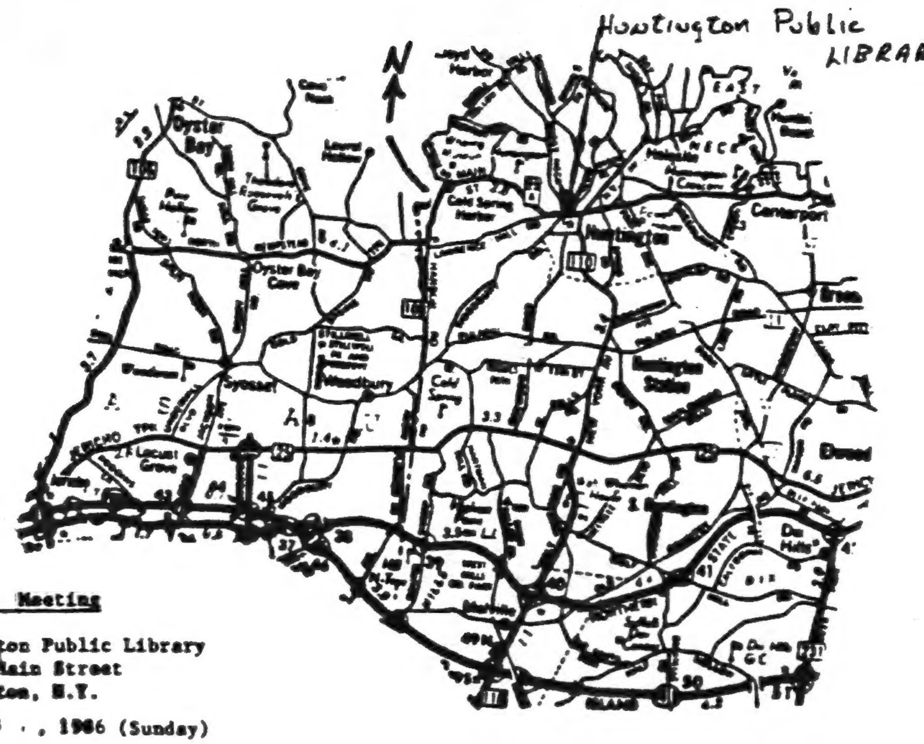
TO:

Jan-87
Don Lambert
3310 Clover Dr S
Cedar Rapids IA
52404

LIST
P.O. BOX 438
CENTERPORT, N.Y. 11721-0438

Long Island Sinclair Timex Group
Huntington, NY Library
2 PM





Meeting

Huntington Public Library
RT 25A Main Street
Huntington, N.Y.

April 13 , 1986 (Sunday)

at 2:PM

L.I.E. or N.S.P. to Rt 110 N.
Follow 110 accross RT 25 to RT 25A
Go left on 25A. Library is 4 blocks
down on the left